

Maine's Fisheries

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Author's note: This paper was prepared at the request of Governor John Baldacci in order to describe the importance of fishing to the Maine economy and culture. The paper identifies the nature and scale of the current threats to the fisheries. It encourages fresh, creative ways of thinking about the management and governance roles that both the industry and the State need to develop for the long-term sustainability of our living ocean resources.

The paper is not an official position of the Governor or any state agency.

The Department of Marine Resources posted early drafts of the paper on their website and invited comments from all interested parties. A large number of people, mostly from the industry, responded with constructive and helpful notes. Many of these have been incorporated into this paper; many were not simply because of a lack of time or space; and some were not included because of editorial decisions the author made.

1. Summary

We face a fundamental, overriding problem in our fisheries today – a governance process that works against fishermen's collective, rational interest in conservation. Decisions about conservation are usually avoided because no one can capture the benefits and, in addition, because we don't have (and probably never will have) the scientific ability to know exactly the right thing to do. The result for the State has been the effective loss of most of its fisheries and impoverishment of the ecosystem of the Gulf of Maine. Even the fisheries that remain viable, such as the lobster fishery, are continually at risk because of the loss of ecosystem structure. We have to address these issues. That process has begun in the lobster fishery but it needs to be strengthened there and adapted and expanded to our other fisheries. If we don't do this we will never solve the conservation problem and are very likely to have no viable fisheries in the near future.

2. Background

Knowledge and Governance in Complex Systems

Maine's fisheries are a diverse group of industries that are biologically interdependent, but economically almost independent. They are all directed at the capture of publicly owned resources found in either the territorial waters of the State or in federal waters beyond three miles. Sustainable use of these resources requires a careful balancing of human and biological activity. This requires good science combined with meaningful restraints on fishing activity.

Over the years a complicated system of state and federal regulations has consistently failed to produce this balance and, equally important, has failed to produce an atmosphere in which scientists, policy makers, and fishermen have learned how to better manage the resource. This is especially true in the groundfishery. Almost all our fisheries are in much, much worse condition than they were, say, fifty years ago; and it is undoubtedly the case that the entire ecosystem of the Gulf of Maine has been disrupted and heavily damaged. Perhaps the only fishery whose abundance has been sustained and actually increased over this period is the lobster fishery; good management is at least partially responsible for the long term sustainability of the fishery, but the most plausible reason for the current, historically high levels of abundance is the poor condition of the other species in the system¹.

There are, of course, innumerable reasons offered for this consistent failure. As is usually the case, most of the blame is placed squarely on the shoulders of the other guy and, as is usually the case, there is some truth to what the blame-sayers say. Federal scientists are firmly convinced their science is right and blame a "lack of political will". Many of those who supposedly "lack political will" are firmly convinced the science is deficient. The small boat fleet believes the large boat fleet has decimated the resource, and the large boat fleet busily calculates how many fish the small boats 'really' take. And the game continues, seemingly without end. The important question is why our management institutions create this kind of dead-end process.

The short-term benefits from the game – being able to convince the powers-that-be that your interests need to be protected – are usually tangible and real to all the players. Fishermen fend off more rigorous fishing restrictions, bureaucrats preserve their policies and positions, scientists defend the theories they've espoused for years, and so on. The system gives no one a strong incentive to make the investment in fundamental changes that might conserve the resource. Fishermen who do try to act in a way that conserves the resource learn that their conservation efforts are quickly cancelled out by others and, even worse, that the system is likely to punish them with less future access to the resource (because their use history is proportionately lower). The kind of political dynamic this creates is well recognized. It usually results in very little or no action until a full-blown crisis is upon us. Because of our inability to act, these crises seem to arrive with great regularity. Running through this paper is a consistent policy theme – that our major problem is finding a way to end this game. More formally, this problem has come to be known as 'the governance problem'.

¹ This is definitely not meant to imply that management of the lobster fishery is ineffective. The rules in place have prevented the destruction of the fishery. Given the extremely poor record in so many other fisheries throughout the world this is no small accomplishment.

We should not underestimate the difficulty of ending this “game.” Not only are the incentives for change very weak, but in a very basic way the game occurs because science cannot give us unambiguous evidence of what is necessary to produce a sustainable balance. Managing fisheries and ecosystems is not like building bridges. When we build a bridge we can rely upon the experience gained from building thousands of other bridges. We know the strength of steel and concrete, and can reliably predict the result of building one way or another. And, more importantly, this knowledge gives us the confidence to hand the problem of building bridges to a group of experts (at least the technical part). This removes from the collective decision process a potentially difficult and contentious set of decisions.

But the important components of marine ecosystems are not like steel and concrete. These systems are complex and changing. They are difficult and costly to monitor. Consequently, it is nearly impossible to predict the outcome of our own activities. Even after the fact, it is almost impossible to learn (except in the most broad way) the connection between the current state of the system and our past actions. As a result experts in fisheries, unlike bridge engineers, can’t acquire the confident knowledge and the credibility that accrues from long and well-known track records. Scientists cannot give us magic numbers or silver bullets. Their top-down recommendations are always received with skepticism and rarely implemented. When these scientific circumstances are coupled with a political process in which the players cannot capture the benefits of tough decisions, the decision process stalls and we continue down the road to depleted fisheries and impoverished ecosystems. The problem is not a lack of good will; it is a systemic issue because no one has the incentive or credibility to change the system.

The typical response to this problem – usually when a crisis is upon us – is to call for a man on a white horse, someone who can make a tough decision and impose it on the fishery. This has never worked. It doesn’t work in democratic societies and, surprisingly, doesn’t even work in totalitarian societies. The political process invariably unhorses the man on the horse and the usual ineffective, pedestrian policies result.

In one form or another, all the State’s fisheries face a significant governance problem. This paper emphasizes the problems in the lobster and the ground fisheries. But the fisheries for scallops, shrimp, clams, worms, sea urchins, sea cucumbers, crabs and others all face their own particular governance problems. Fortunately, the State has pioneered new approaches to fisheries governance – a process of decentralized decision-making called co-management. The lobster and urchin councils, although very different from one another, have given us valuable experience in the democratic governance of fisheries. The major question we face in the very near future is whether we can refine and develop this experience so that we can cope successfully with the biological and human complexities of our fisheries.

3. The Groundfishery²

Maine's and New England's groundfishery is in the midst of a very large crisis. The fisheries management process for groundfish has played the game to the hilt, failed to conserve the resource, and nearly destroyed the economic base of the fishery. This crisis is the cumulative result of ineffective Federal regulations that have been driven by and have helped create the current biological conditions. Over the past 20 years these regulations have led to less and less access to the resource, fewer boats, a bias against smaller boats and, now, a tendency to consolidate the remaining access in still fewer boats.

If these trends continue, we may see the transition from a family-owned, market-driven and competitive industry to one characterized by variations of vertical integration³ and, quite probably, relocation to Massachusetts. At this time, populations of some of the major groundfish stocks appear to have begun a recovery following a period of marked scarcity in the late 1990's. However, even if stocks rebound to their levels of earlier abundance, reduced rights of access to the resource and the probable loss of open and competitive markets for fish and for industry inputs almost guarantee an irreversible transition to a corporate, vertically integrated industry. This is a serious and substantial issue for the State and industry; and it needs to be addressed in the very near future.

Compounding and making these problems more urgent is the fact that the New England Fisheries Management Council⁴ is currently in the process of a court ordered, substantial revision of its management approach – called the Amendment 13 process. The deadlines for this process are rapidly approaching (this fall). This requires that the State and industry decide very quickly (by the end of September 2003) on a strategy for dealing with this on-rushing regulatory change.

A brief history

To understand today's crisis it is necessary to understand the history that has led us to this point. Accounts of the 19th and early 20th century paint a picture of a fishery working off very abundant resources. Until the late 1960s Maine had a vibrant groundfish fishery with processing plants in coastal towns the length of the coast. The fishery was characterized by many small-scale seasonal tub trawling boats, small and large draggers all along the coast (in particular, Kittery, Saco/Biddeford, Portland, Chebeague, Cundy's Harbor, Small Point, Boothbay Harbor, Tenant's Harbor, Port Clyde, Rockland, Vinalhaven, Stonington, Swans Island, Bass Harbor, Bar Harbor,

² The term groundfishery refers to boats fishing for cod, flounder, Pollack, haddock, monkfish and other finfish that generally can be found near the ocean bottom. Boats dragging nets (draggers or trawlers) are the most common in the fishery, but gillnetting (using stationary nets that snare the fish at the gills) and hook and line also occur.

³ Vertical integration refers to a situation in which harvesting, processing and distribution is carried out under a single corporate umbrella. This structure circumvents competitive markets such as the Portland Fish Exchange. Contracting between harvesters and processors or distributors generally has the same effects on competition and market structure and is a close approximation to vertical integration. Sometimes this kind of contracting is termed quasi-vertical integration.

⁴ The Council is a Federal advisory body with seventeen members appointed by the Secretary of Commerce. The marine commissioners from each of the five New England coastal states and the regional director of the National Marine Fisheries Service are permanent members. The secretary appoints an additional twelve industry and at-large people from lists provided the governors of the five states.

Winter Harbor, S. Addison, Jonesport and Eastport/Lubec) plus several large-scale, distant water fleet operations out of Portland and Rockland.

The depletion of the fisheries of the Northwest Atlantic began as early as the 1950's. It first impacted Maine in a highly visible way in the mid-1960s, when foreign fleets moved into the Gulf. Crashing stocks (populations) in the late 1960s resulted in the loss of most of the small and mid-sized vessels (those with restricted mobility) and the widely distributed shore-side infrastructure that supported them. This initial impact did not affect the large boat Portland and Rockland fleets because their fishing grounds were in Canadian waters, and the species at which they directed their effort – redfish – was not a target of the foreign fleets.

By the mid-seventies the impact of the distant water foreign fleets was so clearly devastating that nations around the world declared a 200 mile economic or fisheries zone. For Maine, the extension of jurisdiction by both the U.S. and Canada carried a mixed message. In the late 1970s and 1980s, the fish rebounded after the foreign fleets were excluded, and there were very positive expectations about the U.S. ability to manage its own fisheries. New boats were built (almost all with one form or another of government subsidy), and a host of new processing operations begun.

But a World Court decision drawing the U.S./Canada maritime boundary across Georges Bank (implemented in 1984) caused the withdrawal of the Maine and U.S. fleet from previously shared, now Canadian waters. The Maine redfish fleet, which had fished far into Canadian waters, and many Maine and Massachusetts groundfish draggers that had traditionally fished Browns Bank, other parts of the Scotian Shelf and the northern peak of Georges Bank, retreated into US waters. This displaced effort was redirected to the U.S. part of Georges Bank and the Gulf of Maine (GOM) and, along with the rest of the fleet, quickly wore down the recovering abundance of the groundfish stocks.

At the same time the new boundary severely restricted the fishing opportunities from many Maine ports, especially those Downeast. Rockland, for example, changed from being an excellent place to fish (in what are now Canadian waters) to a port located in a relatively restricted corner of U.S. waters. In the extreme, boats from Jonesport to Eastport found themselves tucked into a narrow slice of U.S. jurisdiction. Portland and more westerly parts of the State were impacted much less severely by the new boundaries (except for those boats that fished Canadian waters), but shared with the entire fleet the effects of all the effort withdrawn to the west of the Hague Line.

These new geographical facts and the renewed, this time domestic, depletion of the GOM and Georges Bank, were strong contributors to the current crisis in the fishery. The regulatory response to this depletion and to other problems, such as interactions with marine mammals, has further intensified the erosion and near collapse of the traditional social and economic infrastructure of Maine's groundfish fishery.

Regulatory Issues

The New England Fisheries Management Council and the Federal government have responded to over-fishing principally by (1) restricting the number of days-at-sea allowed each vessel, (2) sponsoring buy-back programs and (3) by employing rules that affect how, when and where fishing takes place, e.g., the mesh size of nets and closing of certain fishing areas permanently or

seasonally. The current court ordered process known as ‘Amendment 13’ promises even more restrictive policies.

In recent years, the particulars of these broad policies have become increasingly burdensome and, in many respects, have tended to disadvantage Maine boats. Simply keeping up with and meeting a bewildering and rapidly changing set of regulatory requirements and maintaining a voice in the regulatory process (e.g., attending Council meetings) has become a virtually full-time job⁵. Regulatory costs are the same for small vessels and large; they are the same (or nearly so) for an enterprise with one boat and an enterprise with several. As is the case in almost all regulated industries, the fixed costs of regulation tend to seriously disadvantage smaller firms. Small firms cannot afford to keep up with and maintain a public presence in the regulatory process. In addition, fewer days fishing, closed areas, rolling closures, and other forms of restriction have meant that fixed costs have to be spread over lower revenues, resulting in lower profits and diminished economic viability. This has led many boats to switch to other fisheries, especially to lobster, or to simply tie-up.

This disadvantage has been played out in a series of stumbling steps in which regulators, fishermen, and the resource respond to one another’s actions. As might be expected, when alternatives are open to the Council there has been a strong tendency to choose the alternative least costly to the majority of interests represented on the Council. That’s part of the game. This has created a fairly consistent, but not uniform, bias favoring the methods and requirements of fishing in Massachusetts, New Hampshire, and Rhode Island⁶.

For example, for small and less mobile boats the most adaptive, economic response to scarcity (natural or regulatory) in one fishery is to switch to another fishery; for larger and more mobile boats the best response usually is to move to where the fish are available. This normal pattern of response, tied-in with the new boundaries and tighter regulations, has tended to cause larger boats in Maine to move to the west where the U.S.-Canadian maritime boundary gives them greater flexibility. Most of the smaller boats switched to the lobster fishery, which has been especially healthy since the late 1980s.

Groundfishermen, particularly gillnetters, in Hancock and Washington counties, were especially hard hit by both the boundary and regulatory problems. The boundary problem was further compounded for all Maine boats when the Council passed a rule severely limiting cod catch north of 42° 20’ (an east-west line located just north of Cape Cod) and allowing unlimited catches below. The geography of this rule was especially hard on small, Maine based boats, but even the larger boats that chose to continue their operations from Maine ports were severely handicapped because their time spent steaming to the 42°20’ line counted against their days at sea.

⁵ The public documents for the Amendment 13 process are over 1,400 pages in length and the document pile will continue to grow until at least May of 2004.

⁶ Maine draggers are not allowed to land lobsters in Maine. They can land lobsters in Massachusetts and New Hampshire. At certain times of the year, late winter in particular, when lobster prices are high and draggers tend to catch many, apparently migrating lobsters, the foregone revenue from not landing lobsters can range up to \$10,000 or more. This creates a strong incentive to land in Massachusetts or New Hampshire. Needless to say, this is an issue that strongly divides the lobster and groundfish industries.

As the New England Council continued to search for ways to exclude actual and potential effort from the fishery, it created new patterns of participation in the regulatory process. Reduced participation in the fishery by certain segments of the fleet has been accompanied by reduced participation in the proceedings of the New England Council; and, as one might expect, has been accompanied by regulations that increasingly reflect the interests of (or that are least costly to) the style and particulars of operation of the boats that remain in the fishery.

The result has been (what appears to be) the permanent exclusion of those elements of the fishery most affected by location or by the high fixed costs created by Federal regulations. Many boats that switched to lobstering have lost their groundfish permits; many boats have accepted Federal buy-outs; and many that tied up have lost their permits. Furthermore, there are strong pressures within the Council to eliminate the 'latent' or potential effort represented by permit holders who have not been fishing in recent years. Today there are less than a handful of groundfish boats operating out of harbors to the east of Penobscot Bay. Since 1994, Maine landings of groundfish have declined from 20% to 10% of all New England landings (although total landings are up).

Ownership and market

Since the extension of US fisheries jurisdiction to 200 miles, Maine's groundfishery has been characterized by vessels of a variety of sizes, most of which were single boat (or two and three boat) family enterprises. Since the early 1980s, the Maine fishery has not had any large corporations with boats tightly integrated with corporate processing and distribution operations, as in neighboring Canada⁷. This should not be taken to mean that the Maine fleet is inefficient or technologically backward in any sense; it is simply connected to the market differently. Rather than a corporate command and control process, Maine relies upon the Portland Fish Exchange. The Exchange consolidates the supplies of large numbers of independent suppliers in the context of a highly competitive and open market. It provides an efficient and transparent market mechanism that gives both independent boats and small independent processors the ability to compete effectively with large integrated operations. It gives sellers the advantages of a competitive market and buyers access to the diverse and relatively stable supplies of a large number of boats⁸.

This pattern of family ownership combined with a competitive market is currently threatened by regulatory trends that are tending to force a consolidation of ownership and a shift to contractual, almost vertically integrated sales. Compounding the problem is the growing weakness of supporting market infrastructure. Boat yards that can cater to the special needs of groundfish vessels, appropriate maintenance skills, suppliers of nets and other equipment, etc. are all fewer

⁷ From the 1930s to the early 1980s Portland and Rockland were home to two vertically integrated, industrial fleets that fished exclusively for redfish mostly in Canadian waters. These companies ceased operations when U.S. boats were excluded from Canadian waters. In Canada, after the collapse and closure of the Canadian cod fishery in 1992, there was a fairly rapid transition from vertically integrated, industrial operations, to one in which independently owned boats fish under contract to large purchasing/processing companies – an arrangement economists refer to as quasi-vertical integration.

⁸ Evidence of the efficiency of the Maine approach can be found in the prices paid to boats in Maine compared with those in Nova Scotia where there is no effective competitive market into which fishermen can sell; in Maine prices generally range 50% to 100% above those paid to independent boats in NS. This is a margin far greater than the higher transportation, lower product quality and higher processing costs faced by NS firms.

in number today than just five years ago. What was once a short trip to a local supplier might now be a three-hour drive to the only one left. Larger operations, as a result, are being forced to create their own (especially maintenance) infrastructure, which is another factor contributing to consolidation. In this situation also, a competitive market is threatened and reinforcing the chances of an irreversible change in the economic characteristics of the industry.

The near future

The cumulative effect of biological scarcity and Federal regulation over the last twenty years has been the slow erosion of the economic viability of the Maine groundfish fleet. The same has happened throughout New England, but Maine has been affected much more by the new Canadian/U.S. boundary and by a regulatory bias that tends to reflect the interests of states to the south and west. In the very near future, as the New England Council continues to reduce access to the resource, it will affect the viability of many of the remaining boats. Fixed costs are high; days at sea are few: The result will be strong pressures to transfer or consolidate days at sea⁹. These pressures will build, and are seen as inevitable by almost everyone in the industry. The implications for Maine are not good.

These changes threaten the independent, family¹⁰-owned characteristic of the Maine fishery. It may be possible for a few boats to stick it out and continue to operate as independent, family-owned enterprises. Nevertheless, every boat owner in Maine is faced with stark choices: “Would it be better to sell out now, get the value of your days-at-sea allocation and salvage what you can? Or would it be better to acquire the assets of the boats selling out, especially their days-at-sea, and hang in there for what may be a rough ride into a corporate, vertically integrated world?”

Neither option is good for the people or the economy of the state. Both lead to a long-term consolidation of ownership. In a market with relatively few sources of supply there are strong incentives for buyers to assure access to product through contractual arrangements. The diversion of landings to contractual arrangements and to other states because of infrastructure problems will have the effect of lowering sales on the Portland Fish Exchange. As supplies going through the Exchange diminish, its ability to provide processors with predictably steady supplies will decline, and its prices will become a less and less reliable indicator of true market price. This will increase even more the advantages of contracting which will lead to even less product going through the Exchange and, of course, a reduction in the overall value of the Exchange to fishermen, the State, and local processors.

⁹ The problem is so acute that the New England Council recently considered, but temporarily rejected, a measure that would have allowed boats to ‘lease’ days-at-sea (DAS). The idea was that more efficient boats (those purchasing leases) would be able to operate for longer periods, reducing the share of their income going to fixed costs. At the same time, less efficient boats (those selling leases) might be expected to cover most of their fixed costs without having to actually fish. The proposal put no limits on consolidation and would have credited the boat purchasing the DAS with the fishing history acquired during the lease period. The result would have been a strong regulatory bias favoring long-term consolidation of rights of access.

¹⁰ ‘Family owned’ is used here as short hand for relatively small operations that are not in a position by themselves to influence the market or the resource. In other words, not Tysons or General Foods.

If the Exchange folds and there is a significant additional loss of essential infrastructure, there will be little economic reason for the Maine fleet to remain in Maine. For those boats that remain in the State, the only way to sell will be through consignment brokers, operating principally out of Massachusetts and New York, or through a contractual, nearly vertically integrated mode similar to the Canadian model. These kinds of market arrangements have characterized the groundfishery in the past. They were the principal reason for establishing the Portland Exchange in the first place. With consolidation we can expect an almost inevitable tendency to move back in that direction.

Paradoxically, the Exchange contributes to the conditions that make both consignment sales and contractual arrangements attractive. The Exchange establishes a public, competitive price that consignment and contract buyers have to match; and it provides independent sellers with the important option of returning to an open competitive market. It is important to realize, however, that if the Exchange folds, independents operating through either consignment sales or contractual arrangements will lose the negotiating strength provided by the Exchange and find themselves strongly disadvantaged in the market.

Resource management issues

To complicate this picture even more, there is a growing scientific discussion about the best way to manage stocks for sustainability. It is possible that the scientific assumptions on which current policies are based may have been at least partially responsible for the long-term decline in New England groundfish stocks. The discussion is basically about the geographical nature of groundfish stocks.

The traditional view assumes that stocks cover a large area (e.g., GOM cod) and are essentially a single, homogeneous population. An alternative view that is more in accord with modern perspectives of ecological systems assumes that stocks adapt to relatively local¹¹ conditions (currents, topography, and so on). These adaptations (either genetic or behavioral) lead to numerous biologically distinct, but genetically only slightly separated populations of the same species (e.g., many subpopulations of cod within a GOM ‘meta-population’¹²) – a heterogeneous population. These subpopulations may mix together at certain times, for example, in feeding aggregations, but spend other times of the year or of their life cycle in different environments to which they may be specifically adapted. It is also true that on a shorter time scale, groundfish are gregarious and may be attached to a particular site for periods of months or years. These patterns of complex population structure are the rule, not the exception, among both marine and terrestrial species. Scientists are increasingly aware that localized natural selection is one of the primary engines that creates biological diversity and the productivity that is so important for the fishery.

¹¹ Local, as used in this context, is a potentially tricky term. What is local depends upon the life history and population structure of individual stocks and this may vary widely. A clam flat might be the appropriate ‘locality’ for clams; the North Atlantic may be the appropriate ‘locality’ for swordfish.

¹² The term metapopulation refers to a population made up of many, fairly distinct, locally adapted subpopulations. It is believed that these local adaptations allow the metapopulation to efficiently exploit food and other resources in the immediate term and that over the longer term local adaptations are a principle source of resilience for the entire metapopulation.

These two perceptions of the biological environment – homogeneous versus heterogeneous – imply very different management approaches. The homogeneous population assumption is consistent with the current, relatively large scale Federal approach. The assumption of a heterogeneous, subdivided meta-population, on the other hand, implies the need to develop regulations and management institutions that operate effectively at both a decentralized and a larger scale, that is, institutions that more closely reflect the multiple scales and geographical areas important to the biological system.

The conservation significance of these differences is best explained in terms of what might happen if we make a mistake. For example, if we actually have numerous subpopulations (of any given species) but assume (as we do now) that we have only a single population, then managing with days-at sea (DAS) or a total allowable catch (TAC) for the entire GOM is almost certain to lead to sequential, or serial, over-fishing of locally adapted stocks. The reason for this is that effort estimated on the assumption that we have one large stock will always be too large for any individual recovering subpopulation¹³. Basically it will be nearly impossible to match effort to the growth capabilities of individual small stocks.

This violates a fundamental requirement of an effort-control approach to fisheries management. In this kind of situation, we would likely see what appear to be promising recoveries aborted as effort moves onto local stocks that have much less growth potential than managers assume. In other words, if it turns out that the assumption of a homogeneous population that ranges over the entire GOM is mistaken, then our current large-scale method of management appears to be a very risky, not a precautionary way to manage. Even with very large reductions in fishing effort we are likely to continue in an impoverished biological regime marked by recurrent economic crises. Neither the public nor the environmental community is likely to tolerate this for much longer.

If we make the opposite mistake, i.e., if we assume we have numerous subpopulations when in fact there is only a single homogeneous population, we may unnecessarily develop new decentralized management institutions appropriate to the assumed local nature of populations. We would wind-up putting unnecessary restrictions on fishing in an attempt to maintain local stocks that don't exist. Boats adapted to the current regulatory approach would have to unlearn fishing practices that work well today but won't in a decentralized regime. In other words, this approach, especially if it leads to a 'too-small-scale-approach', could lead to overly conservative and economically inefficient policies.

If, however, the ecological science on which this approach is based is correct, the economic consequences for both large and small boats as well as the biological consequences of moving in this direction are likely to be much better than provided by the current regime. Basically, moving towards a smaller scale of management does not automatically resolve these problems.

¹³ A fundamental assumption behind effort control approaches to resource management is the ability to match effort (a TAC or total DAS) to the growth capability of the stock. In practice this assumption can be violated if the populations of all local stocks move up and down together. Then it wouldn't matter whether we thought we had one or many stocks. But when localized stocks move up and down separately, fishing effort naturally concentrates mostly on the stocks that are most productive at any time. But this level of effort (calculated for a large stock) is generally too great for the individual local stock. The most likely result is a continuing series of temporary recoveries with each followed by a collapse from 'local' overfishing...

It is likely to make them easier to solve in a technical sense only if a change in the scale of management is accompanied by an effective governance process. Decentralizing the governance of the groundfisheries will also give the State and industry the ability to more effectively influence regulations, so that they are better tuned to our particular circumstances.

Policy Priorities

Federal regulatory processes have proven unable to balance biological and human needs. The result of this imbalance is a death spiral for Maine's groundfish industry.

Regulation and biological scarcity have reduced the number of boats and are leading to a further consolidation of the fleet. As the harvesting sector declines, necessary infrastructure loses its economic base and disappears. Even core market institutions such as the Portland Fish Exchange are endangered. If the Exchange were to fail, a transparent, competitive market would disappear. This would increase even more the incentives for consolidation of vessel ownership, various forms of vertical integration and, very possibly, the physical consolidation of the fleet at a central location in Massachusetts. The Maine economy – fishermen, boat owners, processors, buyers and suppliers – will lose big. There is little reason to believe that the patterns of ownership and market structure created by a transition to a vertically (or quasi-vertically) integrated industry will be reversible, even if groundfish stocks achieve their former abundance.

This situation points to a core set of priority policies that the State should adopt and actively develop. Basically these are policies intended to maintain a viable cluster of economic activity in the groundfishery:

1. First is the maintenance of a competitive market, the Portland Fish Exchange. Without a competitive market, even those boats that might pursue the 'industrial' route will find themselves in a seriously disadvantaged position. Small boats unable to contract with substantial buyers will be forced to sell by consignment which is always a risky and unfavorable way to sell. In both instances, the node of product consolidation will shift more strongly to the south, and processors will have an increasingly hard time obtaining product without going (expensively) to the point of consolidation.
2. Second is the continued presence of essential industry infrastructure. On the input side, this means unloading docks, berthing space, refrigerated storage, trucking and shoreside businesses that service vessels and sell ice, fuel, and gear. On the output side, it means processors and distributors. Clearly without essential infrastructure the costs of fishing in Maine will rise; fishing will be inconvenient and expensive, even for those boats that survive the current period.
3. Third is the assurance of continuing access of Maine boats to the groundfish resources of the GOM. Consolidation of fishing rights in response to the current scarcity of the resource carries with it the very distinct possibility that only a very few boats will retain rights to future access. On the other hand, without consolidation a high percentage of the boats fishing today will have a very hard, probably unsuccessful, time surviving in the next few years. The State must find a way to allow leasing, or some sort of cooperative means for pooling days-at-sea, without at the same time shutting off future access for those boats that wind-up not fishing. If

those future rights are lost, there will not be enough economic activity to support a viable economic cluster; the once prosperous groundfish industry east of Portland will not rejuvenate and the overall volume of activity in the State will be inadequate to support a viable service industry, processing, and the Exchange.

4. Fourth, the State must initiate and fight for policies, especially in the Federal arena, that will develop the institutions needed to balance biological and human needs. In particular, this means finding ways to improve the governance process, preferably through decentralization. The “game” has to end; poor resource management has led us to this situation and will keep us there.
5. Fifth, the various stakeholders in the industry must come together and begin to build a consensus, or at the least to have a constructive dialogue, about how they want the fishery to be managed. DMR must develop or search out a mediated forum in which people can discuss these issues openly and without the need to consider their strategic posture in the “game.”

Beyond these core policies, the State and the industry are faced with two starkly different, possible policy strategies. The first is one that acknowledges and encourages the process of consolidation and transition to a vertically integrated industrial structure, while taking whatever steps might be necessary to protect the interests of Maine boat owners, buyers, processors and suppliers. This is essentially a strategy that accepts the basic thrust that follows from a scientific view of homogeneous fish stocks and the economic consequences that are consistent with that view. It assumes that further reductions fishing effort in the context of the current approach to management will restore fish stocks and the economic fortunes of the industry.

The alternative is a strategy that attempts to retain a fairly diverse, independent family owned fleet and infrastructure operating in a transparent, competitive market. This strategy is consistent with a scientific view of heterogeneous fish stocks. It also will require reductions in fishing effort in order to restore fish stocks. An essential element of this strategy is some form of decentralized, area management for basic conservation and long-term economic viability. *If* this strategy were adopted, it would be necessary to add a sixth core policy:

6. Sixth, the State, industry, and federal regulators must come together and develop some sort of decentralized GOM management unit as part of the current Amendment 13 process.

This is a difficult time for the State’s groundfish industry. The social, economic and biological conditions in the groundfishery all point to a fundamental turning point. The patterns of access to the resource, the operation of transparent competitive markets, the continuing existence of essential infrastructure, and our scientific approach to management may *all* change dramatically in the near future. The New England Fisheries Management Council will make basic decisions as part of the Amendment 13 process in the next few months. To successfully influence that process, the State needs to know what it wants to do and get its political ducks in line within the State, with the other New England states, and in Washington. It needs to put in place quickly a consultative process for the discussion of the industry and State’s alternatives and preferred policies. The five or six basic policy priorities outlined here need to be fleshed out with specifics. This can only be done through an active and timely consultative process.

4. The Lobster Industry

The lobster fishery also faces a governance problem; but the circumstances of the lobster fishery are totally different from those in the groundfishery. Stocks are abundant, at historical highs over the last decade; there is a reasonably competitive and efficient market; supply, distribution and processing infrastructure is strong; the industry has a active marketing arm; incomes are very good; the State has put in place an innovative local governance process to complement its own and Federal (really interstate) regulatory processes¹⁴. Unlike circumstances in the groundfish industry, this layered process of governance is reasonably equitable and responsive to Maine's concerns.

But there are serious concerns that require the attention of both the State and the industry. Two serious external threats are looming on the horizon. The first is the possibility of disease, similar to that occurring in southern New England, or other possible biological events that might lead to dramatic declines in the currently very high lobster population. The second is the possible impact of judicially imposed restrictions on the use of traps pursuant to enforcement of the marine mammal and endangered species acts. Both threats are significant; if they materialize, however, it is not clear that we have the ideas, policies, or governance processes necessary to respond in a timely and rational manner.

Important internal problems also face the industry. Access to the water is becoming increasingly difficult and expensive. Alternative fisheries, traditionally the source of stabilizing income, have almost ceased to exist. Effort (the number of traps, etc.) is far above what is economically sensible and continues to grow; but reasonable and equitable solutions to the problem are not on the table. The State's and industry's investment in scientific research and support is extraordinarily small; and, despite the State's relatively democratic approach to regulation, there are large numbers of lobstermen who stay outside the process.

This and our lack of scientific investment effectively retard a constructive industry-state discussion of possible responses to significant and looming threats like shell-disease. Unlike the groundfishery, most of the problems facing the lobster fishery, even the external threats, may be addressed best by the State and industry. Federal and interstate actions can be important but are not nearly as important as our own.

External threats

From shortly after World War II until the late 1980s, annual landings in the lobster fishery were remarkably stable, ranging from 17 to 25 million pounds. In the late 80s harvests started to increase, and for the last 15 years have been nearly two to three times the post-WWII level. In 2003 landings were at an historic high of 62 million pounds. At the same time, there has been a

¹⁴ Lobsters are regulated through the Atlantic States Marine Fisheries Commission (ASMFC - a regulatory compact among the states enabled by Federal legislation), the individual states and, in Maine, by the local lobster zone councils.

rapid expansion in the market, mostly through sales of frozen product; consequently, prices have remained stable and incomes have marched up along with the growth in harvests.

The dark cloud in this picture is created by our lack of knowledge of why the fishery is doing so well. There is good reason to believe state and federal management is effective but even the most vocal proponents of the current management approach are unwilling to claim that good management has produced the current levels of abundance. Good management may have kept us from destroying the fishery; the current abundance, however, is undoubtedly the fortuitous result of factors beyond our control. Everyone's best guess is that significant stresses to the ecological regime brought about by groundfish depletion are the cause of the current abundance¹⁵.

If this is true, there are strong reasons to be very uneasy about the instabilities that might be bred by these conditions in the ecosystem. The recent lobster die-off in Long Island Sound and the current explosion of lobster shell disease south of Cape Cod are symptomatic of the abnormal patterns that might be expected from an ecosystem stressed like the GOM. Everyone worries that shell disease might come around the corner at Provincetown and head north. But it is just as likely that some other surprise will occur. Asian shore crabs, for example, have recently invaded the State's inter-tidal waters and appear to be efficient predators of small lobsters. It's not known whether or to what extent this might affect lobster recruitment.

About the only ecological expectation shared by scientists and fishermen alike is the certainty that the current high landings are not likely to persist. The difficult question this raises is this: fishing effort is adjusted to current levels of abundance. If abundance suddenly declines and we keep fishing at the current high level, will we deepen the biological decline and push the population into a long period of scarcity? Too many stocks around the world – cod in Newfoundland is the most well known example – have been driven to economic extinction. We can't rule out that possibility with lobster. The questions are: when will the decline come? how rapidly will it occur? and are there steps we can take now to soften its impact (short of restoring the entire ecosystem of the GOM)?

Almost as worrisome are the problems the industry might face because of right whale interactions with lobster gear. There are, for example, serious proposals to eliminate all vertical lines in the GOM. Here also the magnitude, the timing, and the exact nature of the impact on the industry cannot be known. The courts can generate surprises almost as severe as the ecosystem. The best way to prepare for and respond to these possible threats is not obvious. Experts cannot hand us neat solutions. While the courts are somewhat more transparent than the ecosystem, we can only guess at the nature of their possible actions.

Our only real certainty is that we will be faced with surprising and significant problems like these. We know that our own best interests require some sort of preparation, some way of putting ourselves in a position to be able to take appropriate action when what is appropriate – most likely effort reduction – becomes apparent. Laying the foundations that will allow us to prepare for and respond to these uncertainties is something we can do. Fortunately, those same foundations are what we also need to deal successfully with a host of less serious but important internal problems.

¹⁵ This may seem paradoxical but it may be the case that the loss of groundfish predators or simply the declining competition for food resources has allowed the lobster population to boom.

Internal¹⁶ Problems

By far the largest problem facing the industry is the problem of fishing effort. This is a classic, common property problem. Because no one owns the resource until they catch it, there are strong incentives to race to catch the resource before someone else gets it. When everyone succumbs to this strategy, an on-going escalation of fishing capabilities ensues. If your neighbor increases the number of his traps, you have to follow suit to simply to stay in place; if he gets a bigger boat, better electronics, a faster hauler, wire traps, etc., etc., etc., you have to respond. The collective result is far more traps and bigger, better-equipped, faster boats than might be necessary to harvest the same number of lobsters. This raises the costs of fishing and reduces incomes to well below where they might be otherwise – although boat and trap builders may argue the point. Equally important, the process puts in place a dynamic that threatens the biological basis for the fishery¹⁷.

Clearly what is needed is some kind of equitable, effective, collective solution. Unfortunately, the clarity of solutions to this and similar commons problems is lacking. As with the disease problem, there is uncertainty about the extent of the problem, especially the biological problem; there is uncertainty about the biological and economic outcomes of any policies we might put in place; and, especially, there is uncertainty about the appropriate distribution of the costs (who bears the burden) of policies we might undertake to solve the problem. And, just as with the threats of disease and/or court action, we have to put in place ways to make these decisions in a timely and reasonable way.

In the last few years, the industry and State have taken significant steps towards solution of these classic commons problems. Zone councils¹⁸ were established in 1997. They were (or are) a large step in the direction of ending the game. Within a year or so all seven zones voted for trap limits and within four years five of the seven zones had voted for various forms of license limitation. These same items had been on the legislature's agenda for almost twenty-five years without any resolution! The point is that the decentralization of decision-making created the political conditions under which difficult conservation decisions were made. Even if the initiative for these decisions comes from higher up, the creation of a policy dialog at the local level and the ability to adapt broad policies to local circumstances greatly increases the probability of action.

¹⁶ What I mean by 'internal' problems is problems that are of our own making and are also subject to solutions through our own actions. These are problems of the sort Pogo encountered when it was realized that 'we have met the enemy and they are us.'

¹⁷ What sets apart competition in the fisheries from competition in other industries is the distinct possibility that fisheries competition might lead, eventually, to the destruction of the resource upon which the industry is based. This leads to the presumption that government or some other form of collective action might improve upon a competitive market result. Scientists and economists have always drawn this conclusion in the context of a particular species, e.g., we overfish cod, or whatever. There is mounting evidence however, that the relevant damage from fishing is the unrealized destruction of ecosystem structure and functions. Sometimes the short hand for this is 'fishing down the foodweb'.

¹⁸ The coast is divided into seven lobster zones. Each zone has a democratically elected council that can propose changes in fishing rules that have a principally locally impact. Rules can only be changed through a 2/3 vote in a referendum of all fishermen in the zone.

This process is new and far from perfect, and the State can take steps to strengthen it. Realistic solutions to the problems of the fishery have to come from a broad and varied constituency: scientists, fishermen, bureaucrats, and interested citizens. Creating an effective governance process that brings in the knowledge and interests of these constituencies is probably the strongest foundation we can lay for an uncertain future. In practical terms this means:

1. First, more and better science. Science can give us a better understanding of the lobster population and the ecosystem in which lobsters reside; it can give us better ways to observe and monitor the behavior of that system; it can give us more timely warnings of imminent surprises; and it can give us pretty good ideas about the kinds of policies that might and might not work¹⁹. It forms an essential foundation for good management, but we should not expect it to deliver a silver bullet.
2. Science can be especially helpful to local-zone decision making if fishermen are actively engaged in the process of doing the science: in the discussion about science, in at-sea work, and in cooperative research projects. The State and the industry have to acquire the resources necessary to bring science into the zone discussions. Cooperative science has expanded greatly in the last few years; however, the State and the industry have made few efforts to bring the science discussion down to the level of the zones.
3. Finally, DMR, its lobster advisory committee, and the leadership in each zone need to take deliberate and persistent steps to invigorate a public dialog about the science, about equitable ways we can respond to possible problems like shell disease and other downturns in abundance, and ways we can improve the governance process. The zone councils will work well in the face of crisis and will make the State's regulatory role much easier, but only if there is a widespread prior and informed discussion of the issues.

¹⁹ The industry is extraordinarily tight fisted about support for science. This probably comes about because of the ill-considered claims of silver bullets by many scientists and by the equally ill-considered idea held by many fishermen that the taxpayer should pay for activities that principally benefit the lobster industry. The typical full-time lobsterman lands product worth over \$100,000 per year from this publicly held resource. For this opportunity he pays between \$150 and \$250 dollars per year.